**Case Study 1: Managing Student Enrollment with a Stored Procedure**

**Problem Statement:** The university’s enrollment process is managed through a database system, but the current manual or semi-automated approach to enrolling students in courses is inefficient and error-prone.

* Faculty advisors and administrative staff must manually verify whether a student has completed the prerequisite courses for a desired course and check if the course has available seats based on its maximum capacity.
* This process often leads to errors, such as students being enrolled in courses they are not eligible for or over-enrollment in courses, causing scheduling conflicts and resource strain.
* Additionally, there is no standardized mechanism to provide immediate feedback to students or staff when enrollment fails due to unmet prerequisites or capacity limits.
* The lack of automation increases administrative workload, delays enrollment processing, and risks data inconsistencies in the StudentCourses table.

**Requirements**:

* Develop an automated solution to handle student enrollment in courses, ensuring that:
  + The system verifies if the student has completed the prerequisite course (if any) before allowing enrollment.
  + The system checks the current number of enrolled students against the course’s maximum capacity to prevent over-enrollment.
  + If enrollment conditions are met, the system records the enrollment with the appropriate student ID, course ID, enrollment date, and status in the database.
  + If conditions are not met, the system provides clear error messages to inform the user (e.g., student or staff) of the issue.
* The solution must be secure, reusable, and integrated into the existing SQL Server database (UniversityDB) to ensure data integrity and reduce manual intervention.
* The solution should minimize processing time and handle concurrent enrollment requests efficiently.

**Stakeholders**:

* Students seeking to enroll in courses.
* Faculty advisors and administrative staff responsible for enrollment approvals.
* Database administrators ensuring system reliability and data consistency.

**Current Challenges**:

* Manual verification of prerequisites is time-consuming and prone to oversight.
* No real-time check for course capacity, leading to over-enrollment.
* Inconsistent feedback mechanisms for enrollment failures.
* High risk of data entry errors in the StudentCourses table.

**Proposed Solution**: A stored procedure (EnrollStudentInCourse) that encapsulates the enrollment logic, performs prerequisite and capacity checks, and handles data insertion with appropriate error handling.